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CEO Compensation and Earnings Management

Cashing in: Do monetary incentives encourage CEOs to manipulate financial outcomes?

Melker Byström (25325) Jacob Ericsson (25329)

Abstract

In this study we investigate the presence and the directional effect of earnings management in connection with CEOs' incentive programs among companies listed on Nasdaq Stockholm from 2020 to 2022. We use two accrual models and one real earnings manipulation model to identify patterns of earnings management. We find suggestive, but not conclusive results that CEOs are more likely to manage earnings when incentivized by their long-term incentive programs. We also observe strong significance in our real earnings manipulation model that CEOs engage in income-decreasing manipulation when motivated by these incentive programs. Furthermore, this model indicates with marginal significance that CEOs manage earnings less when their short-term incentives increase. However, we cannot conclude if CEOs engage in income-increasing or income-decreasing manipulation for different short-term incentive threshold levels in either of the models. Overall, our findings suggest that variable pay can influence CEOs' decisions to manage earnings, with the most significant evidence coming from the real earnings manipulation model. Conversely, it is more difficult to definitively determine that CEOs are managing earnings through accruals. Our study contributes to the understanding of how CEOs' incentive programs may influence earnings management practices, shedding light on an area with limited exploration in Sweden.

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Keywords: earnings management, short-term incentives, long-term incentives, discretionary accruals, real earnings management

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1.0 Introduction

One of the primary conflicts highlighted in corporate governance studies arises from the differing interests between widely distributed owner-investors and the CEOs appointed to make decisions regarding the firms' investment projects and payout decisions (Bergstresser & Philippon, 2006). CEOs human capital is often linked exclusively to the firms they work for, leading to undiversified wealth portfolios, which usually results in managers being more risk-averse compared to shareholders, who likely have diversified investments (Bakke et al., 2016). This risk aversion may lead managers to prefer less risky projects than those favored by their investors, potentially causing them to overlook opportunities in positive NPV projects. To align managers' interests with those of investors, corporate boards are increasingly offering long-term incentive (LTI) programs, such as stock grants and stock options. This aims to motivate CEOs to improve their company share price and pursue strategic, risk-related goals since the convex payoff structure of these programs allows them to benefit from share appreciation while minimizing their exposure to losses (Mayberry; 2021; Efendi et al., 2007; Abdel-Khalik, 2007). In Sweden, 56% of the companies listed on Nasdaq Stockholm proposed a new LTI program at their ordinary meeting in 2023, which roughly is a 100% increase from ten years prior (Novare Pay Consulting, 2023; KPMG, 2015).

Furthermore, recent studies in the US often overlook short-term incentives (STI), like cash bonuses, assuming that CEOs are primarily motivated by substantial equity grants and holdings. Many scholars view traditional STIs as modest compared to equity incentives, both in absolute terms and relative significance (Core et al., 2003; Harris & Bromiley, 2007). In the US, stock-related pay accounted for 81% of total CEO compensation in 2022 (Bivens & Kandra, 2023). In contrast, the compensation structure of firms listed on Nasdaq Stockholm is different, where STI and LTI constitute 21% and 16% of total remuneration, respectively. Additionally, in Sweden, performance shares account for 45% of the LTI programs, where shares are awarded upon meeting financial, operational, or sustainability KPIs (Novare Pay Consulting, 2023). This indicates that companies are focused on linking CEO performance with metrics that go beyond mere fluctuations in stock prices, as share prices potentially can be unreliable indicators of performance. Other performance measures, such as accounting earnings, can help mitigate this noise and more effectively align the incentives of CEOs and shareholders (Holmström, 1979; Paul, 1992). On the other hand, explicit performance goals in the pay-performance relationship may also have a “dark side” (Bennet et al., 2017).

Earnings management (EM) is a term used to elucidate the opportunities managers have to exercise discretion over a company's reported earnings. It entails risks of deceptive usage for management to mislead investors about the true economic performance, diminishing the quality of financial reporting (Healy & Wahlen, 1999; Dechow & Schrand, 2004). Prominent research over the years has linked the structure of CEO incentive systems to EM, concluding that higher levels of stock and option holdings correspond to increased EM (Bergstresser & Philippon, 2006; Cheng & Warfield, 2005). By contrast, other studies have found no relation in similar settings (Larcker et al., 2007; (Xuefeng) Jiang et al., 2010). Additionally, in response to the enhanced regulatory scrutiny, other papers have investigated if managers instead have shifted away to real earnings manipulation (Roychowdhury 2006; Farooqi et al., 2014) and found a positive relationship with CEO equity incentives (Harris et al., 2019).

However, these findings apply to US firms. The Swedish corporate governance model is unique, differing from the Anglo-American model in several aspects, such as the use of dual-share and pyramidal structures, ownership concentrations, and board compositions. The US accounting standard GAAP also influences how CEO incentives interact with EM and CEOs in the Anglo-American governance model tend to have lower levels of EM than those in the Euro-Continental model (Almadi & Lazic, 2016; Kaserer & Klingler, 2008).

In this study, we investigate the impact of CEO incentives on EM for companies listed on Nasdaq Stockholm. We explore how CEOs, influenced by their STIs and LTIs, manage earnings in terms of both extent and direction. We use two accrual-based models and a real earnings manipulation model (REM) to attain proxies for EM.

We find suggestive, but not conclusive results that CEOs are more likely to manage earnings when incentivized by their LTI programs. With strong significance in the REM model, we observe that CEOs engage in income-decreasing manipulation when motivated by their LTI programs. The REM model also finds marginal evidence that CEOs manage earnings less as their STI increases. However, we cannot conclude if CEOs engage in income-increasing or income-decreasing manipulation for different STI threshold levels. Overall, our findings suggest that variable pay can influence CEOs' decisions to manage earnings, with the most significant evidence coming from the real earnings manipulation model. Conversely, it is more difficult to definitively determine that managers are manipulating through accruals.

1.1 Purpose & Contribution

The objective of this paper is to explore the impact of CEO compensation on EM within the context of Sweden, which features a distinct compensation and governance structure compared to that of the United States. While the link between CEO compensation and EM is well-documented, it has seldom been analyzed in the Swedish context, where the systems differ significantly from those in the U.S. This topic is particularly pertinent given the recent legislation by the Swedish parliament mandating public companies to create a remuneration report and detail various aspects of CEO compensation starting from the fiscal year 2020. This study aims to illuminate this critical area, addressing a gap in the existing research.

1.2 Scope

Our study focuses on companies listed on Nasdaq Stockholm between 2020 and 2022, excluding financial and real estate firms due to their intricate reporting, in line with previous studies. Furthermore, we only include firms that retained the same CEO throughout the period to assess CEO compensation incentives over time and minimize the noise associated with changes in management and their corresponding incentives. We measure EM using both discretionary accruals and real earnings manipulation. The choice to use accrual-based models is driven by their common use in research as a fundamental method for detecting EM, as noted by Dechow et al. (2010). Additionally, we include a real earnings manipulation model, inspired by research from Graham et al. (2005) and Cohen et al. (2008), which shows that managers are increasingly adopting discretionary practices in operational activities under increased scrutiny. Moreover, we use a cross-sectional approach on industry for each year, see section 3.4.1 for further explanations of why.

1.3 Disposition

Our study is organized into eight sections. In Section 2, we introduce key theories and previous research related to behavior, EM, and both short-term and long-term incentives, and the choice of the models to proxy EM. Section 3 connects theory and research to our four hypotheses, details our methodology, and outlines the main regression. Section 4 explains how we selected our sample and collected data. Section 5 presents descriptive statistics, Pearson correlations, and our test results. In Section 6, we analyze these results and include robustness and diagnostic tests. In Section 7 we offer our suggestions for further research, and Section 8 concludes our study.

2.0 Theory and Previous Research

2.1 Agency Theory

Agency theory examines the contractual relationship between two parties who collaborate and share risk but may have differing objectives. Fama (1980) characterizes modern corporations as entities where shareholders are separate from daily management. Eisenhardt (1989) adds that in organizations, this often manifests in the relationship between shareholders (the principal) and the CEO (the agent). To minimize opportunistic behavior by agents, principals can monitor them; however, this is costly, leading to a trade-off between monitoring expenses and losses from such behavior. These costs are known as agency costs, and this dilemma is termed the principal-agent problem. To handle this, one can align the interests by tying CEOs' compensation to company performance metrics or by letting CEOs invest a significant portion of their wealth in stocks and options (Grossman et al., 1983).

The literature on incentive systems is vast and great efforts have been put into designing incentive systems that aim to overcome principal-agent problems. Guay et al. (2019) illuminate the strategic use of accounting-based bonuses to align managers' interests with shareholders. They find that while accounting-based bonuses have a significant impact in a CEO's early tenure, the significance of these bonuses wanes as equity compensation becomes more dominant over time. Also, scholars argue that because accounting-based performance measures indeed can be backward-looking, they are susceptible to manipulation by CEOs who may influence their compensations to increase personal gains at the expense of shareholders (Graham et al., 2012; Almadi & Lazic 2016). Furthermore, Bergstresser & Philippon (2006) have also observed that CEOs whose total compensation is more directly tied to the stock price, are more inclined to use discretionary accruals to manipulate earnings.

This indicates that while incentive systems are designed to address principal-agent problems, they are not flawless and may even open for further misalignment between managers and shareholders in cases of EM.

2.2 Corporate Governance in Sweden

The Swedish model of corporate governance resembles the euro-continental due to its concentrated ownership structure, in contrast to the dispersed ownership structures in the US and UK (Agnblad et al., 2002; Lekvall, 2009; Brunzell et al., 2015). Additionally, in Sweden along with very few countries, it is common that publicly listed firms employ both dual share

classes, with differentiated voting rights, and pyramid ownership structures. This is not the case in the US, where only 7% of the Russell 3000 companies have a dual-class share structure, while it is employed by nearly 80% of Nasdaq Stockholm Large Cap (Agnblad et al., 2002; Cieslak et al., 2021; Bång & Waldenström, 2009). Arguably, as controlling owners tend to have more voting rights than cash flow rights (i.e., excess voting rights) (Cieslak et al., 2021), this is a feature that contributes to the high ownership concentration. It is also worth considering that in contrast to the predominant situation in US and UK boards, Swedish boards are entirely or mostly non-executive, where nearly 50% of Swedish firms have no management representation on their boards and CEO-duality is prohibited by law (Cieslak et al., 2021; Lekvall, 2009).

The implications of these different characteristics on EM are uncertain. For example, Lobanova et al. (2019) found that the quality of earnings was higher for firms with dual-class structures, while Li & Zaiats (2017) found contradictory results, with an increase in EM. Furthermore, although the Confederation of Swedish Enterprise argues that Sweden's governance structure provides strong shareholder protection, earlier research indicates that Sweden in fact offers weaker protection compared to Anglo-American countries (Agndal et al., 2002). Almadi & Lazic (2016) find that strong protection diminishes the risks of EM caused by CEO incentive-based compensation.

2.3 Earnings Management

2.3.1 Definition

EM refers to the process by which management intentionally influences the financial statements to reflect a desired performance level. One of the most widely accepted descriptions of the phenomenon was coined by Healy & Wahlen (1999); "Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers".

A consequence of EM is the negative impact it has on the accounting system's ability to accurately measure true performance, effectively reducing earnings quality (Dechow et al., 2010). Burgstahler & Dichev (1997) argued that EM is used as means to avoid financial losses and earnings reductions. This notion corresponds with findings from Kasznik & McNichols (2002), Kasznik (1999), and Alshariri et al (2017), which suggest that EM is often driven by

the aim to surpass or at least meet a comparative benchmark. This connects to a core idea known as "earnings smoothing", where managerial discretion is used to stabilize revenue fluctuations. CEOs employ EM to demonstrate financial improvements compared to previous years, anticipating that future revenue growth will counterbalance any negative effects of mechanical reversals (Baik et al., 2022). Myers et al. (2007) showed that the stock market values firms that are able to maintain smooth earnings, and Kasznik & McNichols (2002) found that meeting or beating benchmarks consistently leads to higher valuations. This type of target beating is a good proxy for EM (Dechow et al., 2010). Cheng & Warfield (2005) found that firms tend to beat consensus with very small margins, or at least be much more likely to just meet the final consensus forecast than to just miss it (Armstrong et al., 2024). Not meeting these benchmarks can become costly for the firm and the CEO because the relationship between stock price and equity-based compensation is indeed non-linear around these benchmarks (Cheng & Warfield, 2005; Bettis et al., 2018).

The concept of smoothing earnings also holds true in the opposite direction, where firms report lower earnings to maintain consistent stability in firm performance year on year (Dechow et al., 2010). On the extreme, (Liu & Sun., 2022) found evidence that firms engaged in more income-decreasing earnings management than usual during the pandemic year. This aligns with the concept of "big-bath," where companies intentionally report substantial losses to enhance earnings in subsequent years if they fall significantly below benchmarks or targets for a specific year (Hope & Wang, 2018).

2.3.2 Accrual-based earnings management

The arguably most accepted methodology in accounting research to detect EM and its damaging effect on earnings quality is to capture managerial discretion through the residuals from accrual models (Dechow et al., 2010). Accruals can be defined as the wedge/difference between firms' cash flows and reported income (Bergstresser & Philippon, 2006). Changes in firm value that are not reflected in the current cash flows often involve a great deal of discretion and the discrepancy between the recognition and realization of revenue and expenses that arise between periods is the essence of accrual accounting. These accruals can be categorized into non-discretionary and discretionary. Non-discretionary accruals are meant to capture adjustments upon objective events that reflect firms' fundamental financial and operational performance, while discretionary accruals are accounting adjustments made at the discretion of management. For example, aggressive revenue recognition or capitalizing costs that should be expensed. (Dechow et al., 2010).

There is no existing model that can perfectly quantify discretionary accruals due to their subjective nature. There have been several models developed to detect EM by identifying total accruals and then subtracting the non-discretionary component, on the assumption that the non-discretionary accruals are modeled properly (Dechow et al., 2010). Jones (1991) established a wide-spread model for capturing the discretionary accruals, and modifications to this model have been made in several influential subsequent papers (Dechow et al., 1995; Kasznik, 1999; Kothari el al. 2005).

2.3.3 Real earnings management

Research has found evidence that managerial intervention in the reporting process can occur not only via accounting estimates and methods, but also through operational decisions (Graham et al., 2005; Roychowdhury 2006;). In light of this, real earnings management has been coined as an expression that refers to manipulating real activities to avoid reporting losses. It can be defined as a behavior departing from normal operational practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations (Roychowdhury, 2006). Cheng (2004) and Roychowdhury (2006) found that firms reduce discretionary expenditures, such as R&D and SG&A, and/or overproduce to reduce COGS in attempts to improve reported margins. Or as found by Bens et al. (2002) to reduce reported expenses by cutting R&D costs, to repurchase shares and avoid EPS-dilution financed by unused R&D funds.

These types of activities can reduce firm value as decisions taken in the current period to increase earnings can have a negative effect on cash flows in future periods. For example, firms can miss out on future positive cash flows and innovative progress by excessively cutting R&D costs, or imposing greater inventory holding costs on the company by the generated excess inventories, both of which are value-destroying.

2.3.4 The use of both accrual-based EM and real earnings management for EM

A decision to include both accrual-based earnings management and real earnings management will be described in this section. First, only examining one type of EM could be insufficient, given that managers might apply the types as substitutes to one another, and thus examining either type of EM runs the risk of partially incomplete conclusions (Zang, 2012). Furthermore, Graham et al. (2005) surveyed CFOs from US-listed firms, finding that nearly 80% would cut R&D, advertising, and maintenance expenses, and 55% would delay new projects to meet

earnings targets, sacrificing long-term value. These methods were favored over the use of discretion within GAAP accounting choices for EM.

Also, Cohen et al. (2008) event study on the passage of the Sarbanes-Oxley Act (SOX), a regulation to improve corporate governance for US-listed, found that accrual-based EM increased until the passage of SOX in 2002, and was thereafter followed by a steady decline. Conversely, the level of REM activities had the opposite effect. One conclusion was that firms switched from accrual manipulation to real earnings manipulation after the passage of SOX. In Sweden, a direct translation to the SOX-act has not been implemented but several financial reporting acts that aim to improve corporate governance and strengthen requirements for auditing and financial reporting have gone through and been updated since[1].

With these findings in mind, following the same reasoning as Harris et al. (2019) and Zang (2012) it could be that managers in a Swedish setting might consider a preference for real earnings management as a result of the increased scrutiny in financial performance settings.

2.3.5 Benefits and costs between the two methods

Zang (2012) notes that the impact of REM on reported figures is uncertain. Managers can address this by evaluating the effects of real earnings manipulation at the fiscal year-end and adjusting their accrual management to offset any unexpected variances, using the two methods as substitutes. Moreover, REM tends to attract less scrutiny from auditors compared to accounting methods, making it harder to detect, however, these activities result in higher long-term costs for companies, as they are value-destroying (Roychowdhury, 2006; Farooqi et al., 2014). Conversely, relying solely on accrual manipulation carries its own risks, as the gap between actual earnings and the target threshold at year-end may surpass the extent to which accruals can be manipulated (Roychowdhury, 2006). On the other hand, REM may result in higher tax expenses in the current period compared to accrual based EM. This is because CEOs can leverage tax advantages, such as aggressively recognizing unearned revenue, without necessarily impacting the current-year taxable income (Zang, 2012).

2.4 Earnings Management and Short-Term Incentives

The impact of STIs on EM has been extensively studied, generating a substantial body of literature, yet researchers encounter conflicting results. Healy (1985) published a seminal article highlighting that existing research on the phenomenon contains significant flaws that

[1] Swedish Code of Corporate Governance, Act (2005:551), Act (2001:883) on Auditors and Audits are examples of acts which have been updated several times to remain relevant and effective.

need addressing. They find that managers use EM to maximize their bonuses through both income-increasing and income-decreasing discretionary accruals, tailored to each CEO's earnings expectations. Specifically, when a CEO exceeds the upper bonus threshold, they tend to make income-decreasing adjustments to position for favorable reversals in the next period that could boost bonus eligibility. Conversely, if a CEO is unlikely to meet the lower bonus threshold, they also opt for income-decreasing accruals to better their chances for a future bonus. For CEOs within the bonus targets, income-increasing accruals are used to directly augment their current bonus. This perspective on STI and EM has become prevalent in EM research, though the findings remain inconsistent. Extending Healy's work, (Holthausen et al., 1995) also found that managers above the upper threshold engage in income-decreasing discretionary accruals. However, unlike Healy, Holthausen did not find evidence that managers below the lower threshold engage in income-decreasing EM.

Moreover, Burns & Kedia (2006) examine several components of CEO compensation and their effect on restatements of reported accounting numbers, a proxy for EM. In their analysis of salary plus bonus, they find no significant evidence that a higher combined total encourages CEOs to adopt aggressive accounting practices. The authors suggest that their contrasting findings to Healy (1985) might stem from using restatements of reported accounting numbers as a proxy for EM rather than discretionary accruals. Additionally, they propose that the decreasing proportion of salary plus bonus in overall CEO incentives compared to the period of Healy's (1985) study could be another factor contributing to the differing results. Harris & Bromiley (2007) corroborates Burns & Kedia's (2006) findings that CEO bonuses have no significant impact on financial misreporting. They argue, in line with Burns & Kedia (2006), that an explanation could be the difference in size between bonuses and other compensation contracts such as stock option grants. They state that the average option grant was valued at 20 times the average bonus in their sample. Furthermore, they argue that as stock options' effect on misrepresentation is shown to be non-linear, CEOs might only be incentivized to pursue misreporting in situations of extreme incentives where the benefits of misreporting outweigh the risk of detection. As the bonus is so small in comparison, the benefits of misreporting do not outweigh the risks associated with misreporting in an American context.

2.5 Earnings Management and Long-Term Incentives

Hall et al. (1997) look at CEO compensation from 1980-1994 and document an interesting evolution of CEO compensation structure. In their sample, the average value of CEO stock options grew by 683 percent, while the average salary plus bonus increased by 98 percent over

the same period. Also, the CEOs' compensation elasticity to the market value of their firm rose from 1,2 to 3,9. Building on this article, Bebchuk et al. (2005) examine CEO compensation from 1993 to 2003 and find that the relative equity compensation to total compensation is continuing to rise.

As CEO compensation in the US increasingly has shifted towards more long-term equity incentives, scholars have examined its potential impacts on EM. Bergstresser & Philippon (2006) investigate this relationship, focusing on stock options portfolios and equity holdings. Furthermore, they also examine the relationship between periods of high accruals and executive option exercises and share sales. They find significant results indicating that CEOs with greater equity incentives run companies with higher levels of EM. Moreover, their findings show that in periods of high accruals, CEOs exercise options and sell of shares at significantly higher rates, further suggesting that CEOs with substantial equity incentives are more likely to engage in EM.

In Burns & Kedia's (2006) investigation of various CEO compensation contracts, they find that CEOs with larger option portfolios are significantly more likely to misreport. They outline two reasons for this. Firstly, they argue that the convexity in CEO wealth introduced by stock options restricts the potential downside risk of misreporting being detected, while offering substantial upside potential. Secondly, by pooling their stock option exercises with other executives who exercise for liquidity and diversification reasons, CEOs can exit their positions more easily without provoking significant market reactions. This strategy effectively camouflages their actions, causing the market to underreact to potentially negative information that might be indicated by CEO option exercises during periods of suspected misreporting. The findings from Bergstresser & Philippon (2006) and Burns & Kedia (2006) are supported by Harris & Bromiley (2007) as they also conclude that stock options have a significant effect on EM. Contrary to the aforementioned articles, Armstrong et al. (2010) use propensity-score matching to analyze equity incentives' effect on accounting irregularities and conclude that equity incentives do not have a positive significant relationship with accounting irregularities. Similarly, Erickson et al. (2006) cannot find any significant relationship between equity incentives and firms accused of fraud by the SEC. These conflicting results highlight that even though extensive research has been conducted, there is still no general consensus in the literature, leaving room for further investigation.

2.6 Choice of Earnings Management Models

2.6.1 Choice of accrual-based models

The Modified Jones model (MJM) developed by Dechow et al (1995) is a commonly used model for detecting EM and is an extension of the Jones (1991) model. The original Jones model was set up to relax the assumption that the difference between accruals between years are only due to changes in discretionary accruals. It handles this problem by including gross PPE and change in revenue, which implies that the model can control for changes in non-discretionary accruals as well. Dechow et al (1995) deemed the original Jones to be subject to type-II errors (classified accruals as non-discretionary when they were not) and thus modified the Jones model to adjust for credit sales in an attempt to reduce type-II errors. This was based on the belief that credit sales frequently are manipulated, as it is easier to disproportionately recognize earnings on credit sales compared to cash sales. Consequently, this modification increased the power to yield residuals that are uncorrelated with normal/non-discretionary revenue streams and thus better reflect revenue manipulation. However, this model still suffers from type-I errors, false-positives (Dechow et al., 2010). Guay et al. (1996) conducted a robustness check between accrual models, and found that MJM provides reliable estimates for discretionary accruals. We decide to include this model.

The Kasnik model is an extension of MJM, where the inverse asset variable is replaced with changes in cash flows from operations. The model includes changes in cash flows from operations as it has been shown to negatively correlate with total accruals (Dechow, 1994; Kasznik, 1999). We decide to include this model as the residuals potentially reflect a more accurate representation of the discretionary accruals as it controls for operational discrepancies between periods of time. Following the findings from Dechow et al. (1995), it also relaxes the assumption that revenues are non-discretionary.

Since MJM struggles with type-I errors, it can for example lead to a potential misclassification of discretionary accruals in firms with extreme sales growth (Kothari et al., 2005). The Kothari model can enhance accuracy by incorporating ROA as a performance matching component, thus reducing the misidentification of working capital investments and its accruals, which accompany sales growth, as discretionary (Kothari et al., 2005). However, adding the ROA in a linear regression will not be as well specified compared to the intended performance-matched approach (Kothari et al., 2005). In this study, we will run the regressions linearly and cross-sectionally, and research has shown that the Kothari model can add noise in the measurement

of discretionary accruals and result in lower power test, we decide not to include this model (Dechow et al., 2010).

2.6.2 Choice of real earnings manipulation model

Identifying real earnings manipulation involves recognizing its inherent ambiguity in distinguishing deviations from standard operational practices that do not aim to enhance shareholder value. Observed variations among firms, such as differences in the timing or structuring of investments, might stem from prudent business decisions or varying strategies, rather than from managerial discretion (Gunny, 2010). For this study, the proxies for estimating real EM are derived from Roychowdhury (2006), with some modifications by Zang (2012) and Cohen et al. (2008). They exclude abnormal cash flows from operations since the manipulation could impact this variable in different directions, resulting in an ambiguous net effect. Hence, we will include abnormal production costs and abnormal discretionary expenses to explore if firms are either increasing earnings by reducing the COGS by overproducing inventory, and/or cutting discretionary expenditures, including R&D, SG&A, and advertising costs. The authors provided evidence that abnormal production costs and abnormal discretionary expenses effectively capture real earnings manipulation. These two measures will then make up a composite score, REM.

3.0 Method

In this section, our hypotheses will be introduced. This will be followed by a description of the chosen models used to estimate discretionary accruals, accompanied by some method choices. Lastly, a presentation of the main regression models used to test our hypotheses are introduced, and meticulous considerations around the variables in the models, as well as some definition clarifications.

3.1 Hypotheses Development

Foundational research by Healy (1985), Gaver et al. (1995), and Holthausen et al. (1995) demonstrates that managers manipulate reported earnings to maximize their bonuses through accruals manipulation. Contrastingly, subsequent research in the US has found no significant effects between STI and EM, explained partly by the declining share of STI (Burns & Kedia, 2006). However, STI still accounts for a significant part of total remuneration in Sweden. In 2021 and 2022 CEOs on the Nasdaq Stockholm received STI averaging about 45% of their base salary. This figure includes firms where no bonuses were awarded, yet despite this, STI remained a significant element of overall compensation packages (Novare Pay Consulting,

2023). This highlights its ongoing importance and the risks of CEOs engaging in EM to maximize their cash-bonus outcome. Therefore, we hypothesize the following:

H1: A higher level of STI scaled by base pay for the CEO will be associated with higher levels of earnings management.

It has been noted that in Sweden, the adoption of LTI programs has seen exponential growth over the past decade. Although the components in the programs can offer slightly different characteristics, they share a common feature: a convex payout structure. This structure entails that failing to meet targets set for getting the compensation does not severely impact the executives' wealth negatively, while getting the compensation can prove very profitable. Several prominent studies in a U.S. context (Bergstresser & Philippon, 2006; Cheng & Warfield, 2005; Harris & Bromiley, 2007) have found that CEOs whose overall compensation is more closely tied to the company stock price tend to lead companies that exhibit higher levels of EM. This relationship suggests that greater incentives linked to stock performance may motivate these executives to engage in EM to align with market expectations and their personal financial interests. In light of this, our second hypothesis is as follows:

H2: A higher level of LTI scaled by base pay for the CEO will be associated with higher levels of earnings management.

Researchers have extensively studied earnings smoothing, a practice generally involving the use of managerial discretion to reduce fluctuations in reported revenues (Baik et al., 2022). Managers may adjust figures upward to show a modest improvement over previous periods, with the expectation that future revenue growth will mitigate any adverse effects of these manipulations. Both Myers et al. (2007) and Kasznik & McNichols (2002) found that consistently meeting or beating benchmarks leads to higher company valuations. We believe that this rationale can be applied to LTIs. Given that LTI values are typically closely linked to a firm's stock price, activities such as earnings smoothing are particularly relevant in this context. Since we hypothesize that CEOs engage in both income-increasing and income-decreasing forms of EM, we specify the third hypothesis accordingly:

H3: LTIs will have no clear dominant directional effect on earnings management, as CEOs manipulate earnings both upwards and downwards.

Dechow et al. (2010) observed that companies may lower their reported earnings in years with high revenues, thereby making future targets less challenging to achieve. Income-decreasing EM may also occur when companies fail to meet annual benchmarks, deliberately lowering results to improve future performance and reset expectations, thus enhancing the perception of future financial health (Liu & Sun, 2022). Arthur Lettic, a former head of the SEC, noted, "When earnings take a major hit, the theory goes, Wall Street will look beyond a one-time loss and focus only on future earnings." These behaviors around financial benchmarks and market expectations can be closely linked to CEO remuneration. Holthausen et al. (1995) and Gaver et al. (1995) found that managers decrease reported earnings to enhance future bonus compensation when they exceed their maximum threshold. Mixed results have been observed when managers realize they will not meet the lower bound. Furthermore, if managers exceed the lower bonus threshold but not the upper one, research has indicated that they often increase income through discretionary accruals. This manipulation aims to optimize bonus outcomes by aligning reported earnings more closely with target thresholds. We specify the fourth hypothesis:

H4: CEOs will manipulate company earnings in different directions depending on the size of the bonus they expect to achieve.

3.2 Accrual Models

To test the hypotheses, the accrual models will be quantified according to the MJM and the Kasznik model. Arguments for the selection of these models have been described in section 2.6.1.

The models are designed to isolate the discretionary accruals, which are the proxies for EM, by delineating them in the error terms of the regression models. The variables in the model are chosen to capture and reflect the natural business variations, i.e. the non-discretionary accruals. The regressions are estimated cross-sectionally for each industry and year.

The estimation process will be conducted as follows:

Total accruals in a specific firm are estimated by calculating the difference of net income and cash flows from operations, as seen in equation (1). Cash flow from operations can either be extracted from the cash flow statement or indirectly through the balance sheet. The latter approach can cause measurement errors in certain non-operational activities, divestitures, and M&As (Collins & Hribar, 2002), hence we derive it from the cash flow statement.

$$TA_{i,t} = NI_{i,t} - CFFO_{i,t} \quad (1)$$

Consistent with the guidelines from Dechow et al. (1995) and their MJM, we have estimated the discretionary accruals as detailed below. In line with the approach outlined by Dechow et al. (2010), we have included the intercept:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev_{i,t} - \Delta Rec_{i,t})}{A_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \varepsilon \quad (2)$$

The Kasznik model estimates discretionary accruals accordingly:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{(\Delta Rev_{i,t} - \Delta Rec_{i,t})}{A_{i,t-1}} + \beta_2 \frac{PPE_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta CFFO}{A_{i,t-1}} + \varepsilon \quad (3)$$

All variables in both models are scaled by lagged assets to improve comparability and account for size differences between firms in the sample since it otherwise could affect the estimation of discretionary accruals (DA) (Cohen et al., 2008; Prior et al., 2008). As mentioned, the level of DA for a specific firm, *i*, in a given year, *t*, are captured in the error term (ε). For variable definitions, see Appendix 1.

3.3 Real Earnings Manipulation Model

As proxies for detecting real earnings management activities, we test for abnormal production costs and abnormal discretionary expenses. Like the accrual-based models, the proxy for abnormality/discretionary behavior is captured in the error terms.

These models are displayed in equations 3 and 4 respectively. The regressions are estimated cross-sectionally for each industry and year.

The estimation of the normal level of production costs:

$$PROD_{i,t}/A_{i,t-1} = \beta_0 + \beta_1(\frac{1}{A_{i,t-1}}) + \beta_2(\frac{Rev_{i,t}}{A_{i,t-1}}) + \beta_3(\frac{\Delta Rev_{i,t}}{A_{i,t-1}}) + \beta_4(\frac{\Delta Rev_{i,t-1}}{A_{i,t-1}}) + \varepsilon \quad (4)$$

For clarity, the higher the error term, the larger the amount of inventory overproduction, and thus the greater the increase in reported earnings through reducing the cost of goods sold.

Furthermore, the estimation of the normal level of discretionary expenditures is measured by the following equation:

$$DISX_{i,t} / A_{i,t-1} = \beta_0 + \beta_1(\frac{1}{A_{i,t-1}}) + \beta_2(\frac{Rev_{i,t-1}}{A_{i,t-1}}) + \varepsilon \quad (5)$$

In accordance with Zang (2012), Harris et al. (2019) and others, the error-terms in (RM_{disx}) are multiplied with -1, such that higher values indicate greater cuts in discretionary expenses by firms to increase reported earnings, thus manipulating earnings upwards. For both models, we use revenue as a proxy for net sales. Lastly, the two components, RM_{PROD} and RM_{disx}, are added into a composite score that serves as a proxy for real earnings manipulation, the REM model. See variable definitions for these two equations in Appendix 1.

3.4 Method Choices

3.4.1 Time-series approach and cross-sectional approach

A required step in assessing EM involves choosing between a time-series or a cross-sectional approach. The time-series approach was initially used in the original Jones model (Jones, 1991) and it is designed to identify EM by looking at one firm over a long time to fit the regression model for the estimation period. However, criticism has been raised with regard to the large data samples required for time-series in this setting (Dechow et al., 1995; Subramanyam, 1996). Another issue is the fact that accruals have self-reversing properties which could lead to specification problems, as the residuals could be serially correlated (Peasnell et al., 2000). It also causes survivorship bias, and the parameters are relatively worse specified compared to the cross-sectional approach (Subramanyam, 1996). This has led to a predominant use of the cross-sectional approach in later studies (Kasznik, 1999; Roychowdhury, 2006; Cohen & Zarowin, 2010; Zang, 2012) as it overcomes the issue of relying on large data samples and serially correlated residuals. The cross-sectional approach looks at companies in the same industry at one specific time, to fit the model used to determine the non-discretionary component of total accruals. While it remains a popular choice in recent literature on the subject, it still has potential issues worth bearing in mind. It has been shown that the cross-sectional approach has been less effective in capturing mean reversions in accruals, and dynamic accrual management strategies. It also introduces noise in the parameter estimation because companies can be structurally different, even in the same industry (Peasnell et al., 2000). Considering these factors, we have determined that a cross-sectional approach is most appropriate for our study.

3.4.2 Absolute and signed discretionary activities

To interpret EM, one can look at absolute or signed values of discretionary activities, which calls for two different interpretations. For the objectives of this study, we will investigate both. Absolute values capture the magnitude of EM, i.e. the variability and the total presence of

manipulation regardless of whether it is income increasing or decreasing, in line with H1 and H2. Conversely, signed values allow for the interpretation of the direction in which earnings are managed, utilized in H3 and H4. For the latter approach, it can lead to offsetting effects between upward and downward management over time, potentially leading to inaccuracies in identifying EM across multiple years.

3.5. Main Regression Models

3.5.1 The models

For H1, H2, and H3 the following equation (6) will be utilized, to determine the magnitude as well as the directional effect on the independent variables. See variable definitions in Appendix 2.

$$EM = \beta_0 + \beta_1 STI + \beta_2 LTI + \beta_3 Size + \beta_4 Lev + \beta_5 Equity + \beta_6 ROA + \beta_7 MTB + \beta_8 GROWTH + Year\ FE + Industry\ FE \quad (6)$$

For H4, we modify the equation slightly, to incorporate different levels of STI as independent variables and add two interaction terms, holding everything else constant.

$$EM = \beta_0 + \beta_1 STI + \beta_2 STI(0) + \beta_3 STI(Low) + \beta_4 (High) + \beta_4 LTI + \beta_5 Size + \beta_6 Lev + \beta_7 Equity + \beta_8 ROA + \beta_9 MTB + \beta_{10} Growth + \beta_{11} STI{:}STI\ Low + \beta_{12} STI{:}STI\ High + Year\ FE + Industry\ FE \quad (7)$$

3.5.2 Dependent variable

The dependent variable, EM, denotes the degree of discretionary manipulation. Given the utilization of three distinct models to estimate EM, see sections 3.2 & 3.3, our regression analyses for hypothesis testing will rely on three distinct sets of variables. Additionally, for hypotheses H1 and H2, EM is computed as an absolute value, while for hypotheses H3 and H4, EM is calculated as a signed value. The variables are winsorized at the 1st and 99th percentile, to adjust for extreme observations.

3.5.3 Key independent variables

Our key independent variables, STI and LTI, represent short-term incentives and long-term incentives, respectively. Novare Pay Consulting has collected remuneration information from companies listed on the Nasdaq Stockholm and has been publishing an annual report titled "På tal om lön" since 2016, and shared their dataset with us for this thesis. STI refers to the cash

bonuses earned by CEOs within a given fiscal year, a straightforward metric to assess performance-based rewards. The interpretation of LTIs is intricate and multifaceted. While we acknowledge potential variations, as reporting practices for this type of compensation can differ slightly among companies, the following provides the overarching approach and structure:

The long-term compensation plans are recommended by the compensation committee and subsequently approved at the annual meeting. Novare Pay Consulting has compiled the LTI values, primarily sourcing data from the companies' annual reports. Additionally, calculations for the maximum allocation are derived from the notice of meeting. Companies report the IFRS cost in their annual reports, representing the market value of long-term compensation attributable to the performance during the reporting year. This figure encompasses all active programs outstanding at the time of report composition. It's important to note that this value reflects the worth of the programs, not necessarily the actual payouts made to executives. This is how we interpret LTI's for this thesis as this is how it mostly is. We acknowledge that there can be variations, as companies can choose to report this type of compensation differently. Lastly, STI and LTI are scaled by base pay.

3.5.4 Control variables

Control variables are winsorized at the 1st and 99th percentile to adjust for extreme observations.

Size will control for firm size and has been calculated as the natural logarithm of the firm's market value of equity. Size has been incorporated as a control variable in several studies investigating CEO compensation and EM (Bergstresser & Philippon, 2006; Burns & Kedia, 2006). Yu (2008) shows that larger firms have amassed more analysts covering the stock which significantly impacts EM negatively. It is argued that as more eyes are on the company, managers are reluctant to manage earnings as they fear being exposed. A negative relationship with EM is therefore expected in our model with absolute values.

Leverage is computed as Debt-to-capital ratio, meaning Total Debt divided by Equity and Debt. Leverage is controlled for, as research has shown that firms with higher levels of leverage are more likely to manipulate earnings, to meet debt covenants (Anagnostopoulou & Tsekrekos, 2016; Burns & Kedia, 2006; DeAngelo et al., 1994). We expect a positive relationship with EM in absolute values.

Equity has been calculated as a CEO's own equity relative to the market value of equity of the firm. The impact of equity ownership on earnings management has been studied extensively

and there have been mixed results, although most of the prominent studies found a positive relationship to EM. Bergstresser & Philippon (2006) and Cheng & Warfield (2005) both conclude that equity holdings and stock option holdings have a positive association with EM. However, Armstrong et al. (2010) find that CEO equity holdings have a negative impact on EM. We anticipate a positive effect on EM in absolute values.

ROA is calculated by taking net profit and scaling by average assets. Kothari et al. (2005) suggest that the effect of ROA on discretionary accruals varies based on the nature of the accruals. The authors highlight differences when accruals are extremely negative or positive. This indicates that the relationship between ROA and EM cannot be assumed to be uniform across different levels of accrual extremity. However, a negative relation is assumed for absolute values as studies have found that firms are motivated to manipulate earnings because of poor performance (Dechow et al., 2011). We therefore use ROA as a proxy for profitability (Farooqi, 2014; Zang, 2012).

Market-To-Book (MTB) is calculated as the market value of equity scaled by the book value of equity. Firms with a higher MTB ratio experience higher growth speculation from investors, which has been shown to have a positive correlation to earnings management, as those firms are more incentivized to meet optimistic analyst targets (Madhogarhia et al., 2009). A positive correlation in absolute values is therefore anticipated.

Growth is calculated as the one-year percentage change in revenue from in year t−1 to year t to account for revenue growth. Lee et al. (2006) find that firms that have experienced higher growth tend to over-report, thus managing earnings to a relatively higher extent. Therefore, we expect a positive relationship with the dependent variable in absolute values.

3.5.5 Definition of threshold levels for bonuses

To investigate H4, positing that managers engage in different directions of manipulation contingent on the size of the expected bonus, we have implemented various thresholds to group bonus size relative to base pay. These thresholds are categorized into high, medium, low, and zero STI. We include interaction terms for high and low against STI, where the reference category is effectively medium. We modify the threshold levels determined by Healy (1985). Due to the absence of data on the upper bound for individual companies, we instead integrate a market capitalization-specific threshold as a proxy for the perceived “max-level” bonus. This threshold is determined by companies being categorized by Nasdaq Stockholm as either large, medium, or small cap. This adjustment is predicated on the understanding that the upper bound,

i.e. the maximum level of the bonus relative to base pay varies across capitalization categories in a Swedish setting, see Appendix 3. Put simply, this highlights that what constitutes a high STI varies depending on the company's market capitalization. Appendix 3 illustrates that CEOs of larger companies have greater potential to achieve a higher percentage of the bonus relative to base pay. For instance, CEOs in small-cap companies, where the median maximum bonus allocation is around 50%, would perceive a 50% bonus-to-base ratio as high if achieved. Conversely, managers in large-cap companies, where the median maximum allocation is around 70%, would generally not consider a 50% bonus-to-base ratio as the maximum achieved. To adjust for this, we proxy the upper threshold level to the midpoint between the median and the upper quartile of each capitalization level, according to Appendix 3. The rationale behind this proxy is that we want to be able to examine the behavior of CEOs who know that they will reach their maximum bonus. We deem our chosen thresholds to strike a suitable trade-off between omitting bonuses that should be categorized as high, and avoiding categorizing too many bonuses as high when they should not be. Furthermore, the intermediate range, "medium," is designated as the reference group in the regression analysis.

There are three primary reasons for distinguishing between "low" and "0" STI thresholds rather than combining them into a single category. Firstly, if we were to exclude the "low" threshold, any extremely low positive outcomes would be categorized as "medium." By doing this, we forego the potential insight that could be gained from understanding the behavior of CEOs getting a very small insignificant bonus. Additionally, grouping 0.5 bonuses with 0.05 bonuses could lead to confounding results for the medium group, as the incentives associated with these two levels of bonuses may be substantially different. Thirdly, we aim to analyze the interaction effect between the reference group and the “low” group. Setting the low threshold to zero would eliminate the possibility of having an interaction term due to zero variability. However, we keep the group “STI = 0”, to gain a proxy of the directional effect on CEOs’ behaviors in scenarios where no bonus is awarded.

The threshold levels for high are therefore STI >= 0.9 for large cap, STI >=0.75 for medium cap, and STI >= 0.6 for small cap. The threshold levels for low; STI <= 0,1 for large cap, STI <= 0,1 for medium cap, and STI <= 0,1 for small cap. Thus, the medium intervals are as follows; 0.1< STI large cap < 0.9, 0.1< STI medium cap <0.75, and 0.1< STI small cap <0.6. High, low, and 0 are assigned indicator “dummy” variables. Lastly, we standardize (z-score) the continuous moderating variable to reduce multicollinearity issues.

4.0 Empirical Data

4.1 Sample Selection & Industry Classification Standard

For our study, we focus on companies listed on the Nasdaq Stockholm Stock Exchange's main market from 2020 to 2022. 355 companies were in the dataset provided by Novare Pay Consulting (2023) in 2022. The inclusion criteria for our study are detailed below:

We classify firms into sectors and industry groups using the Global Industry Classification Standard. Specifically, we exclude companies in financials and real estate due to their complex financial reporting, which makes EM calculations unsuitable (Roychowdhury, 2006; Kothari et al., 2005). This classification reduced our sample size by 78 companies. To accurately assess the alignment between CEO incentives and EM, we require that companies retain the same CEO throughout our study period. Changes in CEO leadership led to further reductions in our sample by 78 companies.

Companies that underwent an IPO or were delisted during the study period are excluded. Additionally, firms with missing data points in our extractions from Capital IQ or those lacking sufficient disclosure of CEO remuneration are also removed. This reduced our sample by 45 companies.

Furthermore, Kothari et al. (2005) states that industries with at least 10 yearly observations should be included. We make one exception and include the GICS industry group Materials with 9 companies. However, companies in the sectors of Communication Services and Energy are excluded due to insufficient observations, which reduced our sample by 8 companies.

To avoid losing too many observations, if there are too few observations within an industry group, we consolidate these groups into larger sectors. In one instance, we also merge two similar sectors, Consumer Staples and Consumer Discretionary, into a single sector. Detailed sector and industry group distributions can be found in the table below, with a final sample of 146 companies per year.

Table 1. Firm observations per Sector / Industry Group and year

Sector Code	Sector / Industry Group	2020	2021	2022	Total
15	Materials	9	9	9	**27**
20	Capital Goods	45	45	45	**135**
20	Industrials	15	15	15	**45**
25 & 30	Consumer Discretionary & Staples	27	27	27	**81**
35	Health Care Equipment & Services	10	10	10	**30**
35	Pharmaceuticals, Biotechnology & Life Sciences	19	19	19	**57**
45	Information Technology	21	21	21	**63**
	Total	**146**	**146**	**146**	**438**

4.2 Data Collection

Financial data is retrieved from Standard & Poor's Capital IQ to estimate EM and for most of the control variables in the main regression. The data is in fiscal year values, where everything is in Swedish SEK. We have obtained data on CEO equity holdings from 2019 to 2022 through Holdings. Share price information was sourced from Excel and supplemented with data from Avanza. Industry group classifications were retrieved through Refinitiv-Eikon. Additionally, as mentioned remuneration figures have been compiled by Novare Pay Consulting, from whom we received their datasets.

5.0 Results

5.1 Descriptive Statistics

In Table 2, the descriptive statistics of the variables included in the main regression model are displayed. We find that the MJM and the Kasznik model produce different mean and median of the absolute discretionary accruals, as indicated by the difference. In light of this, a decision to perform a t-test and Wilcoxon Signed rank test (Appendix 4) to test the statistical significance of the differences was made. Results show that the difference in mean and median is statistically significant, indicating a systematic difference in the residuals generated by the two models, implying that the classification of discretionary activities is different. This could stem from the type-1 error (false-I) which has been mentioned as a limitation of the MJM (Kothari et al., 2005). However, the mean and median are strikingly similar with signed values

of zero, which is an indication that the income-increasing and income-decreasing behaviors seem to cancel out the EM value in both models. We also observe a mean of zero in the REM model. This indicates that managers are managing accruals and real activities based upon the fact that they need to revert back and take losses in some years that have been deferred in prior years, and vice versa (DeFond & Park, 2001; Zang, 2012).

Furthermore, the minimum level of leverage is negative. This situation could occur from consistent losses over time, leading to a depletion of shareholder equity. However, the mean and median conclude that this problem is not present for most of the sample firms, and we find that most control variables differ slightly but are overall consistent with previous EM research that has used similar variables (Burns & Kedia, 2006; Gaio et al., 2022)

Table 2. Descriptive Statistics

Variable	**Min**	**Max**	**Median**	**Mean**	**SD**
REM absolute	0.004	1.084	0.169	0.212	0.168
MJM absolute	0.000	0.354	0.032	0.042	0.041
Kasznik absolute	0.000	0.338	0.025	0.035	0.035
REM signed	-0.963	1.084	0.022	0.000	0.264
MJM signed	-0.251	0.354	-0.001	0.000	0.059
Kasznik signed	-0.198	0.338	-0.001	0.000	0.049
STI	0.000	2.967	0.366	0.394	0.369
LTI	0.000	8.580	0.000	0.268	0.857
Size	18.306	28.412	22.820	22.856	1.945
Equity	0.000	0.283	0.001	0.016	0.048
Leverage	-0.190	0.804	0.304	0.303	0.198
ROA	-0.319	0.169	0.038	0.026	0.077
MTB	0.368	29.975	3.077	4.519	4.792
Growth	-0.649	4.493	0.105	0.207	0.621

5.2 Pearson Correlation Matrix and VIF Test

In Appendix 6, we present the Pearson Correlation Matrix to examine the presence of multicollinearity in our dataset. A low correlation among independent variables is desirable,

indicating a low risk for multicollinearity. To further evaluate the potential multicollinearity, a VIF test has been conducted on equation 6 which is analyzed in 6.5.1, see Appendix 5.

Examining the Pearson Correlation for absolute values, Size, and ROA are negatively correlated with EM, showing significance across all three models at low levels. STI negatively correlates with significance at low levels with REM and MJM. Additionally, Equity demonstrates a positively significant correlation at low levels in the accrual models, while Leverage negatively correlates at similar levels. In the Kasznik model, MTB displays a positive low significant correlation with EM. The other control variables do not show a significant relationship suggesting that there is no clear linear association.

For Pearson with signed values, LTI correlates negatively with significance in the REM model. In the accrual models, Leverage negatively correlates with EM, while ROA is positively correlated, both with significance. ROA and MTB negatively correlate with significance in the REM model. Growth shows a positive significant correlation in the Kasznik Model. The other control variables do not show any significant correlation with EM.

Furthermore, looking at the correlation between the independent / control variables for both signed and absolute, most correlations indicate values between -0,2 and 0,3, with overall strong significance, and we, therefore, find that the risk for multicollinearity is low. What stands out is the correlation between size and STI and LTI, which is around 0.3 - 0.4. From this, we can assert that higher levels of size moderately predict higher levels of STI and LTI. Finally, it's noticeable that the REM model doesn't exhibit nearly as strong a correlation with the accrual-based models as the accrual models do with each other. This reinforces the idea that accrual-based EM and real earnings manipulation could act as substitutes for each other, possibly due to heightened scrutiny and the accompanying costs of detection (Zang, 2012).

5.3 Regression Results

Our analysis encompasses three separate models for detecting EM. MJM and the Kasznik model are established to detect accrual-based EM. A composite score of abnormal production costs and abnormal discretionary expenses will be used to detect REM. For hypotheses 1 and 2, the magnitude of EM and whether higher levels of STI and/or LTI will have a positive effect on the dependent variable is of interest. For hypothesis 3, we explore whether higher levels of LTI have any directional effect, while for hypothesis 4, we examine if certain threshold levels of STI have any impact on the directions of EM.

Table 3. Results with absolute values [2]

	REM	MJM	Kasznik
STI	-0.040*	-0.001	-0.004
	(0.024)	(0.006)	(0.005)
LTI	0.021**	0.001	0.004*
	(0.010)	(0.003)	(0.002)
Size	-0.019***	-0.002*	-0.002*
	(0.005)	(0.001)	(0.001)
Leverage	0.0003	-0.015	-0.026***
	(0.041)	(0.011)	(0.009)
Equity	0.126	0.112*	0.046
	(0.135)	(0.039)	(0.033)
ROA	-0.198*	-0.052	-0.063
	(0.116)	(0.030)	(0.025)
MTB	0.005***	0.001*	0.001*
	(0.002)	(0.0005)	(0.0004)
Growth	-0.006	0.0004	0.0004
	(0.011)	(0.003)	(0.003)
Constant	0.594***	0.091***	0.076***
	(0.100)	(0.027)	(0.024)
FE	YES	YES	YES
Adj.R-sq	0.160	0.110	0.137
F-stat	6.215***	4.390***	5.325***

Table 4. Results with signed values [3]

	REM	MJM	Kasznik
STI	0.059	-0.004	-0.002
	(0.038)	(0.008)	*(0.007)*
LTI	-0.051***	-0.003	-0.002
	(0.016)	(0.003)	(0.003)
Size	-0.0002	0.001	-0.0004
	(0.007)	(0.002)	(0.001)
Leverage	-0.012	-0.027	-0.031**
	(0.075)	(0.018)	(0.013)
Equity	-0.337	-0.024	0.004
	(0.270)	(0.085)	(0.049)
ROA	-0.464**	0.185***	0.206***
	(0.199)	(0.067)	(0.037)
MTB	-0.007**	-0.001	-0.001
	(0.003)	(0.001)	(0.001)
Growth	-0.044*	0.013***	0.014***
	(0.022)	(0.005)	(0.005)
Constant	0.060	-0.009	0.016
	(0.174)	(0.038)	(0.035)
FE	YES	YES	YES
Adj.R-sq	0.030	0.021	0.067
F-stat	1.831***	1.597*	2.951***

Significance levels: *p<0.1, **p<0.05,*** p<0.01

5.3.1 Absolute values

Short-term incentives and earnings management with absolute values

The first hypothesis asks whether a higher level of STI relative to base pay has any significant positive impact on the level of EM. All three models show a negative relationship with STI, but only the REM model is significant at a 10% level. This suggests that a higher level of STI induces CEOs to engage in less EM. However, this indicates a possible association, but it does

[2] With absolute values on the dependent in the main regression, we observe the magnitude effect on EM.

[3] With signed values on the dependent in the main regression, it changes the interpretation of the coefficients as it explores their directional impact on EM.

not reach the conventional level of statistical significance at the 5% level. With these results, and our hypothesis of a positive relationship between CEO compensation and EM, we are not able to reject the null hypothesis.

Long-term incentives and earnings management with absolute values
The second hypothesis investigates if the level of LTI has a positive significant impact on the level of EM. The Kasznik model finds evidence at a 10% significance level that CEOs with higher levels of LTI manipulate earnings more, which is in line with our second hypothesis. We find no significance through the MJM, even though it shows a positive relationship but a standard error that reflects a variability that can turn the coefficient negative. The observed differences between the accrual models will be discussed in section 6.2.

We also find a positive relationship between LTI and EM from the REM model with statistical significance at a 10% level. Therefore, we can reject the null hypothesis that there is no significant relationship between LTI and EM, at a 10% significance level for the REM model and the Kasznik model. However, it does not meet the 5% threshold conventionally used.

Control variables and the models' explanatory power with absolute values
We find a negative relationship between Size and EM, significant at the 1% level in the REM model, while the other two models demonstrate marginal significance. Additionally, the Kasznik model displays that Leverage has a significant negative relation with EM. The REM model indicates a positive relationship but lacks significance. We can also observe a negative coefficient between ROA and EM, with marginal significance in the REM model at a 10% level. Furthermore, we find a positive coefficient for CEO's equity holdings, across all three models. However, only MJM shows marginal significance at the 10% level. Moreover, we can observe a significant positive relationship between the MTB and EM for all models. It's particularly strong for the REM model at a 1% significance level.

For the explanatory power of the models, the adjusted R-squared are 0.160, 0.110, and 0.137, for the REM model, MJM, and the Kasznik model, respectively. The F-statistics are 6.215 4.390, and 5.325, for the REM model, MJM, and the Kasznik model, respectively.

3.5.2 Signed values

Long-term incentives and earnings management with signed values
The third hypothesis investigates if the level of LTI has any directional effects on EM. The REM model shows a negative significant directional effect at the 1% level. This entails that CEOs with larger LTI programs tend to manage earnings downward. We can infer the same

directional effect in the accrual-based models but cannot conclude a significant relationship. Hence, we can reject the null hypothesis in the accrual models, since there is no clear directional effect, but are unable to reject the null hypothesis in the REM model as it shows a clear dominant significant directional effect at the 1% level.

Furthermore, the Kasznik model highlighted a marginally significant positive effect on the magnitude of EM but could not discern a directional effect with significance with signed values. This suggests that while LTI may account for a variability effect, namely volatility, it cannot establish a directional influence.

Short-term incentives and earnings management with signed values

STI without considering threshold levels is not of interest for hypothesis 3. A separate regression has been conducted and examined further down for STI with signed values. However, we can observe that there are no clear directional effects on this variable across the three models, highlighting the need to investigate STI on different threshold levels.

Control variables and the explanatory power with signed values

For size and equity, we cannot find specific directional effects on EM as the three models are contradictory and neither show significance. Leverage has a significant negative directional effect in the Kasznik model. We observe the same direction in the REM model and MJM, but with no significance. MTB displays a negative directional effect across all three models but is only significant in the REM model at a 5% level. ROA has a negative directional effect in the REM model at 5% significance which contradicts the coefficient in the accrual models at 1% significance.

The explanatory power of the models is considerably lower in this setting. The adjusted R-squared values are 0.030, 0.021, and 0.067, for the REM model, MJM, and the Kasznik model, respectively. The F-statistics are 1.831, 1.597, and 2.951, for the REM model, MJM, and the Kasznik model, respectively.

3.5.3 Signed values with threshold levels for STI

Table 5. Different Threshold Levels for STI with Signed values

	REM	MJM	Kasznik
STI	0.027 (0.029)	-0.007 (0.007)	-0.007 (0.006)
STI 0	-0.044 (0.053)	-0.013 (0.012)	-0.014 (0.010)
STI Low	-0.035 (0.484)	-0.065 (0.115)	-0.082 (0.073)
STI High	-0.030 (0.079)	0.002 (0.016)	-0.003 (0.014)
LTI	-0.047*** (0.017)	-0.004 (0.003)	-0.003 (0.003)
Size	-0.001 (0.008)	0.001 (0.002)	0.0001 (0.002)
Leverage	0.002 (0.076)	-0.020 (0.017)	-0.026* (0.014)
Equity	-0.277 (0.263)	-0.018 (0.008)	0.010 (0.053)
ROA	-0.462** (0.202)	0.192*** (0.088)	-0.210*** (0.058)
MTB	-0.007** (0.003)	-0.001 (0.001)	-0.001 (0.001)
Growth	-0.472** (0.023)	0.013*** (0.004)	0.014*** (0.004)
STI: STI Low	-0.111 (0.529)	-0.097 (0.131)	-0.106 (0.080)
STI: STI High	-0.008 (0.040)	0.006 (0.009)	0.009 (0.007)
Constant	0.090 (0.180)	-0.018 (0.038)	-0.007 (0.035)
Year / Industry FE	YES	YES	YES
Adjusted R-squared	0.028	0.029	0.073
F-statistic	1.607**	1.626**	2.641**

Significance levels: *p<0.1, **p<0.05,*** p<0.01

In Table 5, we present the results for our fourth hypothesis, which examines the outcomes using distinct threshold levels for the cash bonuses received by managers on signed values of EM, see Section 3.5.5 for definitions. In the accrual models, the reference category, STI (medium), displays a negative directional effect, whereas in the REM model, it is positive. To interpret the full effect of the high STI threshold variable, we examine the reference category and add the interaction term. We find that the accrual models exhibit a positive coefficient for the interaction term. This amounts to a full effect greater than the reference category. However, the REM model shows a negative direction of the interaction term, leading to a full effect that is less than the reference category. Since both components show insignificant results, we cannot draw any definitive conclusion about the full effect of STI high. The same process for interpreting the full effect of STI low reveals negative, but insignificant coefficients for the interaction terms across all three models. The negative coefficients suggest that CEOs are managing downwards within this threshold. However, the lack of significance across the three models makes the results inconclusive.

As detailed in section 3.5.5, the STI 0 threshold group does not have an interaction term due to zero variability. Holding all else constant, in instances where no bonus is achieved, suggests a negative directional effect. However, this observation lacks statistical significance. From the results displayed in Table 5, we are not able to reject the null hypothesis, since we cannot conclude with significance that CEOs engage in different directions of EM depending on their STI level.

6.0 Analysis

6.1 Short-Term Incentives and Earnings Management

Our first hypothesis examines whether STIs have any effect on absolute levels of EM, and our results reveal a consistent negative coefficient across all three models. However, only the results from the REM model are significant.

One explanation for the observed relationship concerns the correlation between STI and the size variable. Although our models control for firm size, bigger firms in our sample typically receive a relatively higher STI to base, indicating systematic variation in STI across large, medium, and small market caps. This argument is supported by the Pearson Correlation matrix, which shows a significant and relatively high positive correlation between size and STI, with size demonstrating significant negative coefficients in all three models. This pattern suggests that the apparent impact of STIs on EM could be attributed not directly to the incentive contract

but to the characteristics of larger firms. They are often subject to more scrutiny from analysts, which has been shown to decrease EM, which is also the case in our regression with high significance (Yu, 2008). Consequently, while STIs appear to negatively influence the magnitude of EM, the underlying effect may be distorted or exaggerated by the size variable. Therefore, even though we control for size, its intrinsic link with STI outcomes means that the size may still indirectly affect the relationship between STI and EM.

Another possible explanation for the observed negative magnitude effect might be linked to the findings reported by Burns & Kedia (2006). They suggest that one reason why bonuses do not show a significant positive relationship is because of the decreasing proportion of bonuses to total compensation. However, in our sample, we do not observe the same substantial disparities between STIs, and total compensation compared to the American setting (Novare Pay Consulting, 2023: ISS Corporate, 2023). Additionally, a factor that is important to take into account is the CEOs' equity holdings alongside their standardized remuneration programs. We observe that the mean and median of their equity holdings are 52 and 7 times greater than their STIs, respectively, in our data sample. Given the substantial magnitude of these equity holdings relative to STIs, CEOs may be hesitant to engage in EM. The value of their equity is directly tied to the stock price, which could significantly fluctuate due to market reactions if EM is exposed, where Enron Corporation is an extreme example of this.

This observation serves as a segue to our fourth hypothesis, which investigates the directional effects that different levels of STIs have on EM. We can conclude that there are no statistically significant results across the three models, indicating that we cannot establish any clear relationships regarding whether the level of bonuses managers receive influences the direction in which they manipulate company earnings to achieve those bonuses. The inconclusive nature of our results may partly stem from the possibility that the STIs are not substantial enough to influence managerial behavior. Harris & Bromiley (2007) provide further context for these findings by suggesting that CEOs typically engage in EM only when the incentives are exceptionally large, sufficiently so that the potential rewards clearly surpass the associated risks and potential consequences of detection.

Such situations of extreme incentives simply do not appear with STIs in our sample, as the bonuses are capped at a "max-level" that for most companies is less than their base salary (Novare Pay Consulting, 2023). Even though STI's are larger for Swedish companies

compared to their peers in the US, they still might not be large enough for CEOs to justify undertaking the risks associated with actively engaging in EM.

Although all our results do not show significance, analyzing them is still valuable as it can provide insights into how they relate to existing literature. For the reference category, medium, the REM model indicates that CEOs in this group might be inclined to manipulate earnings upwards to secure a higher bonus. However, while this pattern is suggested in the REM model, it's contradictory for the accrual models as the reference category here shows a negative coefficient. Due to a lack of significance, we cannot assert a definitive relationship with EM.

Furthermore, when analyzing CEOs' incentives in the upper threshold "high" compared to the medium category, we found that in the REM model, the difference effect was negative. In contrast, in the accrual models, the difference effect was positive. One possible reason why CEOs in the "high" threshold may manipulate their earnings less positively compared to CEOs in the reference category could be that CEOs who are confident of receiving a high bonus may have less incentive to make upward adjustments. This is because such adjustments would not impact their STIs for the current year but could potentially inflate the targets for the next year (Holthausen et al., 1995). A contradictory explanation for more aggressive upward manipulation relative to the reference group suggests that managers who reach the "high/upper-bound level" do so because they aim to maximize their bonuses. This occurs either because they are unaware that they will exceed the maximum level, or they are solely focused on increasing their bonuses as much as possible (Holthausen et al., 1995). Note that these arguments are speculative, as the reference category yields contradictory results and the total effect of being in the high STI group is nearly zero across all models.

Moreover, for the full effect of STI Low and the direction of STI 0, all models indicated the same negative direction, as described in 5.3. One explanation could be that CEOs engage in income-decreasing EM, so the reversals in the following periods would improve the likelihood of getting a bonus in the future (Healy, 1985). Strategies for this behavior could also be to get more attainable bonus targets for the following year and to enhance the credibility of future performance improvements, by utilizing that investors often look past one-time losses, focusing instead on projected future earnings (Hope & Wang, 2018). However, we cannot conclude that this is the case, as neither of the coefficients shows significance.

6.2 Long-Term Incentives and Earnings Management

To analyze LTI programs' impact on EM, it is imperative to once again note that LTIs consist of several different compensation contracts, such as different types of options, performance shares, and share rights, and their value is typically linked to stock price. When looking into CEO compensation in Sweden we can see that a large percentage of LTI's are performance shares that yield stocks if certain financial goals are met and zero otherwise (Novare Pay Consulting, 2023). When consolidating various compensation contracts into a single group labeled LTI, it is important to exercise caution when making comparisons with other studies. Many studies have distinguished between different types of incentive contracts or have focused solely on the effect of stock options on EM (Bergstresser & Philippon, 2006; Harris & Bromiley, 2007; Burns & Kedia, 2006). However, we note that these instruments share a convex payout structure, characterized by a high upside and a low downside.

When examining the magnitude effects on EM for hypothesis 2, all models indicate a positive relationship between EM and LTI, with the relationship reaching statistical significance at the 5% level in the REM model and at the 10% level in the Kasznik model. One potential explanation of the statistical differences between the accrual models could be the design of the LTI's, where operational performance criteria such as EBITA/EBIT are the second most used metrics in the incentive programs (Novare Pay Consulting, 2023). To meet those targets, the CEO's discretion can affect the cash flow from operations. Burgstahler & Dichev (1997) argues that cash flow from operations is used to manage earnings and as the Kasznik model accounts for year-to-year cash flow changes, discrepancies between the years could potentially indicate a stronger signal of EM. Especially so in instances where compensation structures are closely tied to operational profit metrics, which often is the case in Sweden.

Moreover, the significant results suggest that Swedish CEOs with greater LTIs are more inclined to engage in EM. This finding aligns with results from American samples (Bergstresser & Philippon, 2006; Harris & Bromiley, 2007; Burns & Kedia, 2006). Previous studies have indicated that a key reason for EM is the extremely strong incentives provided by the convex payout structure of stock options. This structure offers potentially high benefits that could outweigh the risks of detection, thereby encouraging EM (Harris & Bromiley, 2007). They highlighted that the mean CEO stock option was valued at 20 times the mean bonus. Interestingly, as can be seen in descriptive statistics, our data shows that the mean STI is slightly bigger than the mean LTI when including all observations that have programs valued at 0. However, our descriptive statistics also showcase that the maximum size of LTIs in our

dataset is substantially larger than the STIs as these programs are not capped to base pay, which is generally the case with STIs. Thus, we agree with earlier findings, that the potential upside inherent in the structure of LTIs seems to be a conclusive distinguisher for EM.

For our third hypothesis, we were interested in the directional effect of LTI, to get a more nuanced understanding of its full effects on EM. As highlighted in the results section, we found a negative directional effect in the REM model with significance at the 1% level. The accrual models also displayed a negative coefficient although insignificant.

Since LTI's most often are structured for CEOs to reach performance criteria such as EBIT, EPS, and ROE, our definition of LTI's as described in section 3.5.3 indicates that CEOs with high levels of LTI are working in well-performing companies (Novare Pay Consulting, 2023). One reason why we observe income-decreasing EM might be that CEOs confident of surpassing performance targets, may opt to not exceed these targets substantially. This could be to prevent future goals from being set based on abnormally high performance. Also, Burgstahler & Eames (2006) findings show that executives engage in EM to just meet earnings expectations and avoid earnings surprises, a sort of income smoothing. They argue that CEOs want to avoid large earnings shocks, and keep earnings steady over time, which has been shown to have a positive effect on firm valuation (Myers et al., 2007; Kasznik & McNichols, 2002). Therefore, CEOs with large LTIs have incentives to maintain the price stability of their stock price, as they know that their wealth will be more tied to the stock price in the future.

Lastly, the observed strong significant negative directional effect in the REM model could be attributed to the nature of real earnings manipulation activities and their long-term consequences, such as inventory overproduction and reductions in discretionary expenditures, which are value-destroying over time (Roychowdhury, 2006). Given that LTI programs typically span 3-5 years and are designed with a long-term perspective (Novare Pay Consulting, 2023), engaging in activities that destroy value can adversely affect key financial metrics over time, thereby disrupting the value-adding process. For instance, activities that undermine the potential to attract new customers, such as insufficient investment in R&D and advertising, or a need to sell overproduced inventory at discounts. We anticipate that such actions could diminish future valuations of the companies and, consequently, their share prices, which are central to the rewards granted to CEOs through the LTI programs. This could be a reason why CEOs are reluctant to engage in upward manipulation through these activities, and consequently why we observe a significant negative effect.

6.3 Analysis of Control Variables

Size - We observed a negative relationship between Size and EM, with significance in all models. This is in line with our expectations and results from previous studies, where bigger firms are less likely to engage in EM. We cannot point out any directional effects.

Leverage - We anticipated that levered firms would engage in EM to a higher extent and found only marginal significance in the Kasznik model, which showed that leverage had a negative coefficient with EM. Leverage also had a negative directional effect in the Kasznik model, which entails that leveraged firms manage their earnings downwards. The underlying reason for our results could be that if firms are in the act of violating a debt covenant, CEOs might realize that it will be impossible to stave off the violation, in which they manage downward (Jha, 2013). Deangelo et al. (1994) suggest that managers might manage earnings downward to appear less profitable, which might lead creditors to set less restrictive covenants. Another possibility is that firms in our sample with higher leverage don't see a significant risk of failing to meet debt covenants. Thus, firms with more leverage in our sample may not manage earnings more than others simply because of their leverage levels.

Equity - Across all three models, we found that CEOs with bigger equity holdings tend to manage earnings more, even though only MJM had marginal significance at the 10% level. This was in line with previous literature and our predictions. However, a clear directional effect was not observed. Cheng & Warfield (2005) noted that managers with high equity incentives primarily manage earnings to meet specific targets. This could mean that in some years they manage upwards, while in other years they dampen earnings to more easily meet consensus targets in the following year.

ROA - We found a negative coefficient between ROA and the magnitude of EM, with marginal significance in the REM model at a 10%-level, in line with Farooqi et al (2014), and Harris et al. (2019). In this case, high-performing firms have fewer reasons to engage in EM, while firms with lower ratios and potential liquidity issues have greater incentives to manage their earnings (Butler et al., 2004). Regarding the directional effect, ROA is significant across all three models. However, the direction in the REM model contradicts the accrual models. Although we observe that the magnitude of EM decreases with higher ROA, if firms with higher ROA manipulate, then the directional discrepancy suggests that in the accrual models, it is associated with upward manipulation. Conversely, these firms are less inclined to manipulate their operational activities upwards by reducing discretionary expenditures or overproducing

inventory. This restraint from engaging in value-destructive activities could be one of the contributing factors to why these firms remain profitable, and instead manage with accruals.

MTB - We observed a significant positive relationship between MTB and EM for all models, with strong significance in the REM model at a 1% level. This is in line with previous research and our expectations, where firms with higher MTB, experience more growth speculation from investors and those firms should be more incentivized to meet analysts' targets (Madhogarhia et al., 2009). Looking at the directional effect it highlights a negative direction with significance in the REM-model at a 5% level, while the direction cannot be ascertained in the accrual models. A possible explanation is that firms with larger MTB may prioritize marketing to attract new customers and grow into their valuation, thereby avoiding cuts in discretionary expenditures. For the accrual models, these firms may manipulate earnings both upwards and downwards over the years to meet analysts' forecasts, and this strategic variability could be why we observe no clear directional effect.

Growth - We cannot conclude any magnitude effect if firms with growth characteristics manage more or less. However, if growth-oriented firms engage in EM, our significant results suggest they manipulate earnings upward through their accruals without overproducing or reducing expenses in their real activities. One interpretation could be that these two approaches may act as substitutes, as it appears that firms in growth stages are likely to avoid value-destroying activities. Instead, one can interpret that they opt for discretionary adjustments in their accruals, operating under the assumption that future revenue streams will support the reversal of accruals made during their growth phases.

6.4 Differences in Explanatory Power Between Absolute and Signed Models

The explanatory power of the models is considerably lower with signed values. This entails that these models can explain the variability and magnitude of EM better than the directional effect, i.e. if earnings are manipulated upwards or downwards. One reason for this could be the reversal effect, where the income-increasing EM is later offset by the income-decreasing EM, often rendering a low net effect over lifetime earnings (DeFond & Park, 2001).

It is possible that firms in our sample are at different stages of their business cycles, among other factors not captured by our models, which could influence CEO decision-making regarding EM. This complicates the models' ability to capture whether firms are increasing or decreasing their EM at an aggregate level, as suggested by the models' insignificant coefficients, thereby reducing the explanatory power. Compared to other somewhat similar studies, our Adjusted R-squared for absolute values is higher than those reported by

Bergstresser & Philippon (2006) for accrual models. We also observe a higher Adjusted R-squared in the REM model relative to Harris et al. (2019).

6.5 Diagnostic Tests and Robustness Checks in Regression Analysis

6.5.1 Multicollinearity

Multicollinearity exists when independent variables in a multiple regression model are highly correlated. This condition leads to complications in interpreting the regression results, as it becomes challenging to isolate the individual effect of each variable on the variance explained by the model (Farrar & Glauber, 1967). To test for this, we conducted a Pearson Correlation, as outlined in section 5.2, and a Variance inflation factors (VIF) test for the variables in our main regression, displayed in Appendix 5. In research, a level above 4 indicates issues with multicollinearity, but these thresholds can vary depending on the nature of the study and the data involved (O'Brien, 2007). We find that all our variables exhibit VIF values close to 1, which suggests that our model is not subject to issues with multicollinearity. As a result, our results can be interpreted reliably.

6.5.2 Heteroscedasticity

Heteroscedasticity refers to the condition in regression analyses where the variance of the errors is not constant across all levels of the independent variables. This variance inconsistency violates an assumption in OLS and can have several implications for the main regression analysis, such as incorrect conclusions about the significance levels of the coefficient due to biased estimates of the standard errors (Cohen et al., 2002). We used the Breusch-Pagan test on our main regression models with absolute values, that assess whether the variance of the residuals in these regressions was constant across different values of the independent variables (Breusch & Pagan, 1979). Results are displayed in Appendix 7. The REM model had sufficient evidence to reject the null hypothesis of homoscedasticity. In light of this, we applied robust standard errors on all regressions. For further robustness, we integrated time and industry-fixed effects to control for unobserved heterogeneity.

6.5.3 Robustness test - adjusting STI timing to evaluate impact on EM

Given the relatively low explanatory power and the lack of clear directional effects in the models using signed values, we perform an additional robustness check. Although rare, the actual bonus values for year x might be reported in year x+1. Discussions with Novare Pay Consulting revealed that some companies might report the STI paid out during the year, rather than what was actually earned, leading to the figure in the annual report effectively reflecting

the STI from the previous year, resulting in a one-year lag. To address that possibility, we take a lead in the STI data, in an attempt to evaluate the timing and check if this will have any effects on the relation between STI and EM. This adjustment reduces our sample size, as we lack data for 2023, limiting our analysis to two years. We find that STI remains insignificant across all three models, see Appendix 8. Furthermore, the explanatory power has deteriorated across the models, with the MJM displaying a negative adjusted R-squared. These results suggest that the previously described scenario largely does not apply, and that the methodology used in the main regression is more robust.

6.6 Validity, Reliability, and Comparability

Concerning the validity of our study, we have sought to make purposeful decisions in defining our sample, modeling, and tests. We have limited the study to Swedish-listed companies to ensure that companies operate under similar conditions, in terms of regulations and standards. We have examined multicollinearity and heteroscedasticity and added measures to cope with those violations, as well as heterogeneity. We are aware of potential problems with our proxies for EM, with type-I errors in the accrual models, and that REM can capture behaviors that are strategic business decisions rather than intended means of EM. However, as mentioned these models have been modeled and reviewed by numerous researchers and are up to date well renowned as established proxies for EM.

We believe the reliability of our study to be reasonably high. We consider our references to be trustworthy, strengthening our accuracy on the topic. We deem Novare Pay Consulting's dataset to be very strong, and we have thoroughly checked for errors. However, we are aware that our classification of LTI might not capture the exact value of all CEOs due to the complexity of valuing LTIs. The quality of the Capital IQ data is overall strong and has been evaluated against randomly selected companies' annual reports. A few minor differences were observed, but the quality was overall robust, and we excluded companies that lacked data points. Furthermore, our dataset from Holdings consists of the CEO's number of shares held. To get their total equity, we extracted share prices from Excel, complemented by Avanza, and manually calculated the average yearly share price based on the month-end share price. We then multiplied this by the average amount of shares held at the beginning and end of each fiscal year. This was then divided by the market value of equity. Thus, our calculations could be a potential source of error. Throughout the process, we have double- and triple-checked our data to ensure consistency and reliability. Although we have combined data from various trustworthy sources and some proxies had to be made, our progressive work should not risk the

reliability of our study. We consider our study to be replicable, given one can access the information that we have been fortunate to obtain.

The comparability of our study is enhanced by investigating both the magnitude and directional effects on CEO compensation and EM. We include both accrual models and a REM model for better detection. However, comparability is somewhat limited as our study focuses exclusively on Nasdaq Stockholm, reducing its applicability to other markets with varying rules and regulations. Also, the comparability of our study is constrained by its timeframe, which may reflect a period of recovery from COVID-19 and a strained macroeconomic situation. The relatively short duration also limits comparisons with more extensive studies.

7.0 Suggestions for Future Research

This study has given rise to several promising directions for future research, stemming from both our findings and our research methodology.

As noted earlier, while accrual models are commonly used as proxies for EM, they have notable shortcomings. An intriguing research direction would be to replicate this study using various other proxies for EM and compare the outcomes.

Furthermore, consolidating all LTI programs into a single category may introduce noise in the findings, given the subtle differences in their structures and characteristics. A compelling research approach would be to analyze individual LTI programs to determine if specific LTI instruments are more strongly associated with EM. It would also be valuable to expand the scope of our study to include all Nordic countries. This would allow for comparisons between countries and identify whether specific industries are more prone to EM than others.

Given the study's requirement to track the same CEO throughout the entire sample period, we encounter a significant loss of observations due to the turnovers of CEOs. To broaden the study, it would be valuable to explore whether CEOs alter their EM strategies when they switch firms. Additionally, it would be interesting to investigate whether companies that have engaged in EM continue these practices under new leadership. This analysis could help determine whether the CEO is indeed the primary influencer on the extent of EM. Additionally, incorporating the CFO's role could be insightful. A study could effectively examine their incentive programs alongside the CEO's, investigate whether CFO tenure influences the extent of EM, or evaluate the impact of a CFO change. Exploring these ideas could further enhance our understanding of how EM is utilized in a Swedish context.

8.0 Conclusion

In this study, we examine the impact of CEO incentives on EM for companies listed on Nasdaq Stockholm. We explore how CEOs, influenced by their STIs and LTIs, manage earnings in terms of both extent and direction. We use two accrual-based models and a real earnings manipulation model (REM) to attain proxies for EM. As previous studies on EM in relation to CEO incentives have mainly been conducted on U.S. data, our study contributes to the understanding of this phenomenon in Sweden.

We find that the REM model provides marginal evidence that CEOs manage earnings less as their STI increases. To deepen our understanding of whether CEOs manipulate company earnings in different directions based on the size of the bonuses they achieve, we establish our own threshold levels. These serve as proxies to differentiate behaviors among the groups. However, we are unable to conclusively determine whether CEOs engage in income-increasing or income-decreasing manipulation at varying levels of STI. Furthermore, we also test for the possibility that the STI-values had a lag of one year, but cannot find supportive results that this is the case. One possible explanation for the generally weak STI results in our study could be that the STIs are not substantial enough to influence managerial behavior, as they are typically capped at a maximum level. This suggests that the potential benefits of engaging in EM do not outweigh the associated costs.

We find suggestive, but not conclusive results that CEOs are more likely to manage earnings when incentivized by their LTI programs. With strong significance in the REM model, we observe that CEOs engage in income-decreasing manipulation when motivated by their LTI programs. We argue that one reason could be the convex payout structure of LTI programs entices managers to engage in EM. We also offer additional suggestions, such as earnings smoothing, a desire to maintain achievable goals, and a reluctance to engage in value-destroying real earnings manipulation when compensation incentives are long-term.

We believe that our study is a step towards an increased understanding of how CEOs' incentive programs may influence their involvement in EM within a Swedish context. Our findings suggest that CEOs might consider real earnings manipulation, as opposed to relying solely on accruals. However, we recognize that there could be other situations where CEOs have incentives to manipulate earnings and that more research is needed to document EM in a variety of settings.

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Appendix

Appendix 1

Panel A: Discretionary Accruals Estimation Variable Definition

Variable Name	Definition	Data Source
ΔRev	Total Revenue in year t less Total Revenue at year t-1	Capital IQ
A	Total Assets	Capital IQ
ΔRec	Total Receivables in year t less Total Receivables at year t-1	Capital IQ
PPE	Gross Property, Plant & Equipment	Capital IQ
ΔCFFO	Cash flow from operations in year t less Cash flow from operations at year t-1	Capital IQ
NI	Net Income	Capital IQ
CFFO	Cash flow from operations	Capital IQ
TA	Total Accruals calculated as Net Income less Cash flow from operations	Capital IQ

Panel B: Real Earnings Manipulation Estimation Variable Definitions

Variable Name	Definition	Data Source
PROD	The sum of cost of goods sold in time t and the change in inventory which is calculated as inventory in time t less inventory at time t-1	Capital IQ
A	Total Assets	Capital IQ
Rev	Total Revenue	Capital IQ
ΔRev	Total Revenue in time t less Total Revenue at time t-1	Capital IQ
DISX	The sum of advertising, R&D, and SG&A expenditures in time t.	Capital IQ

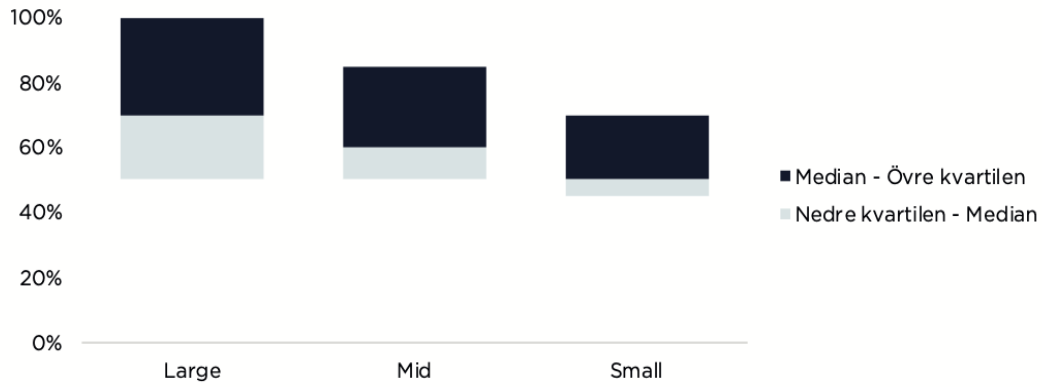
Appendix 2

Main Regression Models Variable Definitions

Variable Name	Definition	Data Source
EM	Both absolute and signed values of the discretionary component calculated from the MJM, Kasznik model, and REM model	Capital IQ
STI	Short-Term Incentives divided by Base Pay	Novare Pay Consulting
LTI	Long-Term Incentives divided by Base Pay	Novare Pay Consulting
Size	Natural logarithm of market value of equity in MSEK	Capital IQ
Leverage	Total Debt divided by Equity and Total Debt	Capital IQ
Equity	Average of numbers of shares held at the beginning and year-end, multiplied by the calculated average yearly share price based on month-end share price. This is divided by the market value of equity in year t	Holdings, Excel, Avanza, Capital IQ
ROA	Net Income divided by the average of total assets in year t and year t-1	Capital IQ
MTB	Market value of equity in year t divided by book value of equity in year t	Capital IQ
Growth	Total Revenue in year t less Total Revenue at year t-1 / divided Total Revenue in year t-1	Capital IQ
STI 0	When STI equals 0	Capital IQ
STI Low	When STI<=0.1 across Large, Medium and Small Cap.	Capital IQ
STI High	When STI>= 0.9 in Large, STI>=0.75 in Medium, and STI>=0.6 in Small Cap.	Capital IQ
STI: STI Low	Interaction term between reference category STI and STI Low	Capital IQ
STI: STI High	Interaction term between reference category STI and STI High	Capital IQ

Appendix 3

Threshold Levels for different market capitalizations



Translation: Median - Övre Kvartilen = Median - Upper quartile; Nedre Kvartilen - Median = Lower quartile - Median

Appendix 4

T-test and Wilcoxon's signed rank test for mean and median differences of MJM and Kasznik

	t-test; t-stat	*Wilcoxon; z-stat*
95% confidence interval	0.006 - 0.013	
Mean difference	0.009***	
Median difference		0.007***

Appendix 5

VIF - Table

Variable	STI	LTI	Size	Leverage	Equity	ROA	MTB	Growth
VIF	1.199	1.208	1.280	1.171	1.034	1.247	1.177	1.149
Tolerance	0.695	0.685	0.610	0.729	0.935	0.643	0.722	0.757

Appendix 6. Pearson Correlation Matrix. **(***For REM, MJM, and KAS - The upper row is absolute, the lower in red is signed.)*

	REM	MJM	KAS	STI	LTI	Size	Lev	Equity	ROA	MTB	Growth
REM	1.00										
MJM	0.14** 0.11**	1.00									
KAS	0.13** 0.12**	0.60*** 0.78***	1.00								
STI	-0.12 -0.02	-0.09* 0.01	-0.08 0.01	1.00							
LTI	-0.27 0.12**	-0.05 -0.05	0.02 -0.07	0.42***	1.00						
Size	-0.26*** -0.08	-0.13*** 0.02	-0.12** -0.003	0.39***	0.34***	1.00					
Lev	-0.01 -0.01	-0.09* -0.09*	-0.13*** -0.13***	0.07	0.14***	0.14***	1.00				
Equity	-0.06 -0.05	0.13*** 0.02	0.01* 0.01	-0.13***	-0.09*	-0.15***	0.06	1.00			
ROA	-0.09* -0.11**	-0.13*** 0.15***	-0.14*** 0.21***	0.17***	-0.05	0.26***	0.11**	-0.03	1.00		
MTB	0.01 -0.15***	0.06 0.01	0.12*** 0.06	0.07	0.01	0.23***	-0.22***	0.01	0.16***	1.00	
Growth	-0.01 -0.08	0.02 0.07	0.07 0.10**	0.09*	0.04	0.001	-0.18***	0.04	-0.27***	0.17***	1.00

Appendix 7

Breusch-Pagan test on our main regression models with absolute values

Model	BP Statistic	Degrees of Freedom	P-value
REM	29.454	16	0.021
MJM	25.352	16	0.064
Kasznik	23.804	16	0.094

Appendix 8 - *1-year Lead STI*

	REM	MJM	Kasznik
Lead STI	-0.027 (0.034)	0.001 (0.007)	0.010 (0.007)
LTI	-0.028 (0.018)	-0.002 (0.004)	-0.003 (0.004)
Size	0.003 (0.009)	-0.0002 (0.002)	-0.001 (0.002)
Leverage	-0.007 (0.095)	-0.014 (0.022)	-0.025 (0.018)
Equity	-0.417 (0.338)	0.049 (0.080)	0.024 (0.071)
ROA	-0.474* (0.257)	0.143 (0.088)	0.185** (0.083)
MTB	-0.008** (0.004)	-0.0003 (0.001)	-0.0003 (0.001)
Growth	-0.072*** (0.022)	*0.015** (0.008)	0.016** (0.007)
Constant	0.025 (0.224)	*0.004* (0.048)	0.012 (0.043)
Year / Industry FE	YES	YES	YES
Adjusted R-squared	0.021	-0.011	0.042
F-statistics	1.413	0.7858	1.849**
Significance levels:		*p<0.1,**p<0.05	, ***p<0.01